

What is claimed is:

1. A low-pin-count chip package comprising:

a semiconductor chip;

a plurality of connection pads arranged about the periphery of the semiconductor chip
wherein the connection pads have a substantially concave profile;

a metal coating substantially formed on the upper surface of the connection pads;

the semiconductor chip has a plurality of bonding pads electrically coupled to the connection pads;

a package body formed over the semiconductor chip and the connection pads in a manner that the lower surface of the connection pads is exposed through the package body;
and

a protective metal flash on the lower surface of the connection pads exposed from the package body,

wherein the substantially concave profile helps to lock the connection pads in the package body.

2. The low-pin-count chip package as claimed in claim 1, wherein the protective metal flash comprises a layer of nickel covering the lower surface of the connection pads, and a layer of metal selected from the group consisted of gold and palladium covering the nickel layer.

3. The low-pin-count chip package as claimed in claim 1, wherein the metal coating is substantially formed on the upper surface of the connection pads as well as a portion of the side surface of the connection pads adjacent thereto.

4. The low-pin-count chip package as claimed in claim 3, wherein the metal coating comprises a layer of nickel covering the upper surface of the connection pads as well as a portion of the side surface of the connection pads adjacent thereto, and a layer of metal selected from the group consisted of gold and palladium covering the nickel layer.

5. A method of making a low-pin-count chip package comprising the steps of:

providing a sheet carrier;

laminating a metal layer on the sheet carrier;

half-etching the metal layer so as to form concavities at predetermined positions thereof;

forming a photoresist layer on the metal layer;
half-removing the photoresist layer such that only photoresist within the concavities is left;
forming a metal coating on the surface of the metal layer which is not covered by the photoresist;
stripping the remaining photoresist within the concavities;
etching the metal layer so as to form a plurality of connection pads having a substantially concave profile;
attaching a semiconductor chip onto the sheet carrier;
electrically coupling the semiconductor chip to the connection pads;
forming a package body over the semiconductor chip and the connection pads wherein the substantially concave profile helps to lock the connection pads in the package body;
removing the sheet carrier; and
forming a protective metal flash on the lower surface of the connection pads exposed from the package body.

6. The method as claimed in claim 5, wherein the protective metal flash comprises a layer of nickel covering the lower surface of the connection pads, and a layer of metal selected from the group consisted of gold and palladium covering the nickel layer.

7. The method as claimed in claim 5, wherein the sheet carrier is a polyimide tape with a layer of silicone adhesive.

8. The method as claimed in claim 5, wherein the sheet carrier is a polyester tape with a layer of silicone adhesive.

9. The method as claimed in claim 5, wherein the metal coating comprises a layer of nickel covering the surface of the metal layer which is not covered by the photoresist, and a layer of metal selected from the group consisted of gold and palladium covering the nickel layer.

10. A low-pin-count chip package comprising:

a die pad and a plurality of connection pads arranged about the periphery of the die pad, wherein the die pad and the connection pads have a substantially concave profile;

a metal coating substantially formed on the upper surface of the die pad and the connection pads;

a semiconductor chip disposed on the die pad and electrically coupled to the connection pads;

5 a package body formed over the semiconductor chip and the connection pads in a manner that the lower surfaces of the die pad and the connection pads are exposed through the package body; and

a protective metal flash on the lower surfaces of the die pad and the connection pads exposed from the package body,

10 wherein the substantially concave profile helps to lock the die pad and the connection pads in the package body.

11. The low-pin-count chip package as claimed in claim 10, wherein the protective metal flash comprises a layer of nickel covering the lower surfaces of the die pad and the connection pads, and a layer of metal selected from the group consisted of gold and palladium covering the nickel layer.

12. The low-pin-count chip package as claimed in claim 10, wherein the metal coating is substantially formed on the upper surface of the die pad and the connection pads as well as a portion of the side surface of the die pad and the connection pads adjacent thereto.

13. The low-pin-count chip package as claimed in claim 12, wherein the metal coating comprises a layer of nickel covering the upper surface of the die pad and the connection pads as well as a portion of the side surface of the die pad and the connection pads adjacent thereto, and a layer of metal selected from the group consisted of gold and palladium covering the nickel layer.

14. A method of making a low-pin-count chip package comprising the steps of:

25 providing a sheet carrier;

laminating a metal layer on the sheet carrier;

half-etching the metal layer so as to form concavities at predetermined positions thereof;

forming a photoresist layer on the metal layer;

half-removing the photoresist layer such that only photoresist within the concavities is left;

forming a metal coating on the surface of the metal layer which is not covered by the photoresist;

stripping the remaining photoresist within the concavities;

etching the metal layer so as to form a die pad and a plurality of connection pads having a substantially concave profile;

attaching a semiconductor chip onto the die pad;

electrically coupling the semiconductor chip to the connection pads;

forming a package body over the semiconductor chip and the connection pads wherein the substantially concave profile helps to lock the connection pads in the package body;

removing the sheet carrier; and

forming a protective metal flash on the lower surfaces of the die pad and the connection pads.

15. The method as claimed in claim 14, wherein the protective metal flash comprises a layer of nickel covering the lower surfaces of the die pad and the connection pads, and a layer of metal selected from the group consisted of gold and palladium covering the nickel layer.

16. The method as claimed in claim 14, wherein the sheet carrier is a polyimide tape with a layer of silicone adhesive.

17. The method as claimed in claim 14, wherein the sheet carrier is a polyester tape with a layer of silicone adhesive.

18. The method as claimed in claim 14, wherein the metal coating comprises a layer of nickel covering the surface of the metal layer which is not covered by the photoresist, and a layer of metal selected from the group consisted of gold and palladium covering the nickel layer.